

Remarks

The following is a response to the Office Action dated August 27, 2003.

The examiner has rejected claims 1-3 and 6-7 under 35 U.S.C. 102(e) as being anticipated by Tsuda U.S. patent 5,933,096. The examiner has moreover rejected claims 4 and 5 under 35 U.S.C. 103(a) as being obvious over Tsuda.

The instant invention, as set forth in independent claims 1 and 6, defines either a first means or a transceiver means for transmitting or outputting a radio signal via an antenna. Moreover, there is means [second means in claim 1 and transceiver means working cooperatively with the antenna in claim 6] for deciding whether or not a radio response from the ETC device on a vehicle to a radio signal output from antenna is received by the antenna. If there is no response while a vehicle is detected by a vehicle sensor to have reached a predetermined position in a radio-communication service zone, then the vehicle is determined to be a non-ETC (electronic toll collection) vehicle. On the other hand, if a response to the radio signal output from the antenna is received by the antenna and the vehicle sensor detects that a vehicle has entered into the radio-communication service zone, then the vehicle is determined to be a ETC equipped vehicle.

Tsuda '096 does not depend on any outputting of signals from the antenna and the response to the output antenna signal from the vehicle for determining whether the vehicle is a ETC vehicle or a non-ETC vehicle. In particular, Tsuda teaches the use of two antennas, namely a sector beam antenna 40 and a broad beam antenna 42, both of which are supported by a gate 38 above a lane 30 on which vehicles travel. An entry sensor 12 is provided at the front end of lane 30 for detecting the entry of a vehicle in a toll collection area 10, and an exit sensor 14 is provided for detecting the exit of the vehicle from the toll collection area 10, when the front bumper of the vehicle is detected by the respective sensors. The sector beam antenna 40 has relatively strong directionality, and high sensitivity to radio wave emanating from within the collection area 10. The broad beam antenna 40, on the other hand, has a relatively weak directionality, and relatively high

sensitivity to radio wave emanating from outside the collection area 10. (Column 4, lines 39-42) Moreover, "[T]he two antennae start operating when a vehicle is detected by the entry sensor 12 to have entered the toll collection area 10, and stop operating when the vehicle is detected by the exit sensor 14 to be leaving the toll collection area 10." (Quoting column 4, lines 46-50. Underlines added)

For the Tsuda system, it is assumed that if no signal is received from a vehicle by antennas 40 and 42, then the vehicle is not a ETC vehicle. The Tsuda system attempts to determine whether a vehicle that has entered the toll collection area 10 is indeed an ETC vehicle, and not a non-ETC vehicle which is followed closely by a ETC vehicle, as shown in Fig. 2 and explained as one of the problems that the Tsuda system attempts to overcome. (Column 2, lines 23-43)

For the Tsuda system, therefore, the focus is on determining if the signal from an ETC vehicle is being emanated from inside or outside of the toll collection area 10. This is accomplished by starting the operation of both the antennas 40 and 42 when a vehicle is detected by entry sensor 12 to have entered into the toll collection area 10. Given the different directionality and sensitivity of the antennas, whether the ETC signal from the vehicle is emanated from within or outside the toll collection area is determined by comparing both of the respective signals received by the sector beam antenna 40 and the broad beam antenna 42 per the circuit shown in Fig. 4 (and the circuits of the other embodiments as shown in Figs. 9 and 11-16) for comparing the relative strengths of the detected signals. And when the received signal A from sector beam antenna 40 is determined to be stronger than the signal B from broad beam antenna 42, a toll charge is collected from the ETC vehicle. (See column 5, lines 1-48 and Fig. 5 which shows signal A being stronger than signal B in the toll collection area 10.)

Thus, Tsuda fails to anticipate the instant invention inasmuch as its antennas 40 and 42 work with entry sensor 12 and exit sensor 14 only in the sense that the antennas are turned on and off when entry sensor 12 and exit sensor 14 detect the entry and exit of

a vehicle, respectively. There is no usage of the detection of the presence of the vehicle with the determination of whether or not a response signal is received in response to a signal output from a sole antenna for determining whether a vehicle is a ETC vehicle or a non-ETC vehicle, per the instant invention. Again, the focus of the Tsuda system is to determine if a signal from an ETC vehicle is emanating from inside or outside of toll collection area 10. On the other hand, the instant invention determines whether a vehicle within the radio communication service zone is a ETC or a non-ETC vehicle, by detecting whether the antenna has received a signal from a vehicle in response to a signal output by the antenna.

To repeat, Tsuda fails to disclose the functional connection between the "fourth means" and the "vehicle sensor", per claim 1. That is, how to use the signal from the vehicle sensor in the instant invention is totally different from such use as taught by Tsuda.

In light of the above, it is respectfully submitted that the rejection of the claims of the instant application by Tsuda is not sustainable. Accordingly, the examiner is respectfully requested to reconsider the application and pass the same to issue at an early date.

Respectfully submitted,



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